AIR CONDITIONING EQUIPMENT MECHANIC LEADER WL-5306-10

UTILITIES HVAC

I. POSITION AND ORGANIZATION INFORMATION

Position:

~~Maintenance Mechanic~~ Equipment, ~~MS~~ WL
Air Conditioning Mech. Leader

Purpose of position:

The primary purpose of this job is to install, maintain, repair, and modify large/complex heating (includes heating boilers and single and multiple fuel power boilers), ventilation, air conditioning and refrigeration (HVAC/R) systems and support equipment including mechanical system controls and distribution lines.

Organization:

Facilities Mgmt Div., Utilities Branch

Organization goals:

II. MAJOR DUTIES

A. Duty (Critical):

Performs typical duties of a Working Leader (12%)

Tasks:

1. Passing on to other workers the instructions received from supervisors and getting work started, e.g., by assigning the immediate tasks to be performed by individual member of the group led;

2. Working along with other workers and setting the pace;

3. Demonstrating proper work methods;

4. Ensure needed plans, blueprints, materials, and tools are available, and that needed stock is obtained from supply locations;

5. Obtaining needed information or decisions from supervisors on problems that come up during the work;

6. Maintaining current knowledge, and answering questions of other workers on procedures, policies, written instructions, and other directives (e.g. technical orders);

7. Ensuring that there is enough work to keep everyone in the work crew busy;

8. Checking work while in progress and when finished to see whether the supervisor's instructions on work sequence, procedures, methods, and deadlines have been met;

9. Urging or advising others workers to follow instructions received from supervisors, and to meet deadlines;

10. Assuring that safety and housekeeping rules are followed;

11. Reporting to the supervisors on status and progress of work and causes of work delays; and

12. Answering questions of supervisors on overall work operations and problems.

Selected Staffing KSAs:

B. Duty (Critical):

Plans and lays out work from blueprints, sketches, drawings, specifications, guides, codes, and work orders. Reviews work order requirements reflecting systems, parts, and assemblies to be repaired, modified, or installed. Visits worksite and analyzes, evaluates, and determines damage when planning repair and modification projects. Makes changes to job layout based on site inspection of job. Interprets and applies complex building plans, blueprints, wiring diagrams, engineering drawings, and maintenance and repair manuals to determine material, tools, and equipment needed for the project and how or what repairs need to be made. (12%)

Tasks:

1. Interprets blueprints, sketches, work orders, and specifications and determines project requirements.

2. Plans sequence of work by accurately determining work to be done and corrective measures to be taken.

3. Determines the proper tools and material required for the job or projects.

Selected Staffing KSAs:

A1, A2, A3, A4, A5, A6

C. Duty (Critical):

Troubleshoots HVAC/R systems with complex problems and extensive repairs requiring judgment to locate malfunctions. Uses specialized test equipment to troubleshoot single and multiple fuel power boilers and associated auxiliary and pollution control equipment, such as water treatment systems, chemical dispensers, electrostatic precipitators, bag houses and ash removal equipment, and wet particulate scrubbers. Troubleshoots problem areas and inspects for defective equipment and faulty wiring. Diagnoses by visual and audible examination of equipment, by application of prescribed test procedures, and by exploration of probable reasons for equipment failure. Tests refrigeration, air conditioning, ventilation, and related control systems and equipment. Tests system operation and detects component malfunctions. Tests pressure and temperature of refrigeration and distribution systems. Uses infrared, ultraviolet, and related testing devices to determine sources of malfunctions. Conducts test of installed equipment for assembly of components and ensuring compliance with technical orders, manufacturers' handbooks and local procedures. Analyzes diagnostic test readings and operating conditions and isolates system malfunctions. (16%)

Tasks:

1. Determines causes of defects and malfunctions on assigned equipment.

2. Determines repairs needed through appropriate testing and inspection.

3. Utilizes testing instruments and equipment.

Selected Staffing KSAs:

A1, A2, A3, A4, A5, A6, A7, A8, A9, A10

D. Duty (Critical):

Installs, repairs, and maintains large commercial and industrial ventilation, refrigeration, air conditioning (AC), and cooling systems with complex problems and extensive repairs. Installs AC units used to condition the air in warehouses, shops, hangars, hospitals, and large office buildings including areas that have special requirements such as communication centers, computer rooms, operating rooms, laboratories, and other areas with sensitive equipment. Installs remote AC systems, cooling towers, packaged self-contained AC units, walk-in and reach-in refrigerators, cold storage plant water coolers, film developers, ice makers, and ventilation and exhaust fans. Repairs insulating materials to air ducts, and cold storage rooms. Dismantles, repairs, and reassembles units such as pumps, impellers, compressors, chillers, receivers, and evaporators. Performs complex repairs, such as installing and fitting connecting rods, crank shafts, piston rings, bearings, and bushings; overhauling valves by adjusting or replacing gaskets, springs, floats, diaphragms, valve fittings, seals, and couplings; and aligning motors and flywheel drives. (12%)

Tasks:

1. Installs and modifies systems and equipment according to specifications using specialized equipment to meet rigid tolerances.

2. Adheres to repair manuals to meet critical requirement levels and completes required repairs.

Selected Staffing KSAs:

A1, A3, A4, A5, A6, A7, A8, A9, A10

E. Duty (Critical):

Installs, modifies, overhauls, repairs, and maintains a variety of complex heating boilers and/or heating systems, single and multiple fuel power boilers, and associated auxiliary and pollution control equipment. Performs work on power boilers which use gas, oil, wood, coal, refuse derived fuel, tire chips, or a combination of fuels for steam or hot water production and distribution plants. Shapes, sizes, measures, cuts, bends, threads, and repairs piping and tubing and insulates high pressure and high temperature piping and components. Mounts, connects, and adjusts components, such as transformers, motors, electrodes, relays, solenoids, switches, pneumatic and electrical thermostats, rheostats, aquastats, steam gland seals, bearings, and drive gears. Repairs and adjusts hydraulic cylinders, speed governors, feed water pumps, fuel lines, coal pulverizers, combustion fans, air compressors, and coal and ash handling equipment. Performs work on regulating valves, feed water valves, safety relief valves, steam traps, automatic controls, motorized

valves, diaphragm valves, solenoid valves, hand valves, etc. (12%)

Tasks:

1. Installs and modifies systems and equipment according to specifications using specialized equipment to meet rigid tolerances.

2. Adheres to repair manuals to meet critical requirement levels and completes required repairs.

Selected Staffing KSAs:

A2, A3, A4, A5, A6, A7, A9, A10

F. Duty (Critical):

Performs essential electrical work incidental to the maintenance and operation of HVAC/R systems. Traces control systems for loose wiring or connections, checks operation of controls with meters and test lights. Locates broken, worn, damaged, or poorly operating wiring, fixtures, controls, and equipment through visual checks or through use of a small variety of test equipment. Makes repairs by removing, replacing, tightening, splicing, soldering, and insulating defective wiring, controls, equipment, and fixtures. Rearranges and installs items, such as outlets, switches, light fixtures, regulators, and circuit breakers. (12%)

Tasks:

1. Plans tasks and determines appropriate steps and actions necessary to complete tasks.

2. Adheres to the National Electrical Code.

Selected Staffing KSAs:

A1, A2, A3, A4, A5, A6, A7, A9, A10

G. Duty (Critical):

Performs preventive maintenance on HVAC/R systems and equipment. Inspects and calibrates controls and gauges. Inspects equipment for condition and proper operation. Lubricates components, adjusts super heat on expansion valves, balances air distribution of systems, re-calibrates controls, replaces driers, drier cores, and drive belts. Examines for wear and tear and replaces worn out parts, bushings, linkage pins, and unserviceable system units and components. Tightens loose connections and glands, re-packs or replaces gaskets. Makes chemical analysis of boiler water and runs test for causticity, phosphate, tennin, total dissolved solids, etc. Performs internal inspection of boilers to determine if tubes are free of scale and corrosion and performs required maintenance. Periodically checks and injects Freon refrigerant and pressures with dry nitrogen. Performs soldering and oxyacetylene welding, cutting, and brazing to shafts, pulleys, compressors, bodies, refrigerant lines, etc. (12%)

Tasks:

1. Conducts periodic inspection and scheduled maintenance of systems and components to ensure proper operation.

2. Prevents major damage or system shut-downs by adhering to proper

maintenance requirements.

3. Determines what adjustments are necessary and whether parts need to be substituted, replaced, repaired, or purchased.e

Selected Staffing KSAs:

A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11

H. Duty (Critical):

Utilizes safety practices and procedures following established safety rules and regulations and maintains a safe and clean work environment. Uses and assures proper fit of required safety equipment and clothing, such as safety shoes, glasses, ear protection, face masks, and/or hard hats. Follows federal and state rules when storing, using, handling, labeling, and disposing of hazardous materials and waste in accordance with environmental standards. Performs clean-up duties, such as cleaning equipment, sweeping, straightening, and lining up tools, and other property in the assigned area. Uses and maintains tools. Maintains bench stock levels of parts, materials, tools, and equipment at prescribed levels. Maintains records and documents actions. Initiates or annotates forms or reports, such as Operator's Inspection Guide and Trouble Report, Temporary Issue Receipt Form, Base CE Work Clearance Request Form, and updates the Civil Engineering Material Acquisition System (CEMAS). (12%)

Tasks:

1. Operates equipment in a safe manner, applying established safety rules and regulations to minimize minor violations and to avoid major violations due to employee error or negligence.

2. Adheres to safety and security procedures and regulations and promptly reports any observed or identified violations in accordance with established guidelines.

3. Uses, maintains, and accounts for all types of hand and/or power tools and test equipment.

4. Prepares record of actions taken and assures documentation is properly signed and coordinated.

Selected Staffing KSAs:

A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11

I. Other Work Requirements

1. The employee may be recalled to duty.

2. This position requires the employee to drive a motor vehicle. An appropriate, valid driver's license is required for the position.

3. This position requires employee to work under adverse environmental conditions.

III. KNOWLEDGES, SKILLS AND ABILITIES (KSAs)

A. Selected Staffing KSAs:

1. Knowledge of the principles and theories of air conditioning and refrigeration and properties of refrigerants.
2. Knowledge of mechanical, electromechanical, and pneumatic principles to inspect, install, test, maintain, and repair power boilers and associated auxiliary and pollution control equipment.
3. Knowledge of the construction and operation of a variety of large industrial and commercial refrigeration and A/C systems
4. Knowledge of electrical equipment, i.e., meggers, test lamps, voltage testers, ammeters, and polarity testers.
5. Knowledge of safety regulations, practices, and procedures.
6. Ability to read and interpret instructions, blueprints, drawings, sketches, and specifications.
7. Skill in dismantling, repairing, and reassembling pumps, impellers, compressors, chillers, receivers, and evaporators to include balancing, aligning, and maintaining turbines, pumps, generators, and ash shredding equipment and preheaters.
8. Ability to maintain difficult balances of a variety of refrigerant controls and complicated motor controls.
9. Skill in troubleshooting complex problems on large projects and applying prescribed test procedures.
10. Skill in the use of hand tools, power tools, and a variety of test equipment.
11. Knowledge of regulations, procedures, and policies related to records maintenance and documentation.

B. Basic Training Competencies:

1. Knowledge of the principles and theories of air conditioning and refrigeration and properties of refrigerants.
2. Knowledge of mechanical, electromechanical, and pneumatic principles to inspect, install, test, maintain, and repair power boilers and associated auxiliary and pollution control equipment.
3. Knowledge of the construction and operation of a variety of large industrial and commercial refrigeration and A/C systems
4. Knowledge of electrical equipment, i.e., meggers, test lamps, voltage testers, ammeters, and polarity testers.
5. Knowledge of safety regulations, practices, and procedures.
6. Ability to read and interpret instructions, blueprints, drawings, sketches, and specifications.
7. Skill in dismantling, repairing, and reassembling pumps, impellers, compressors, chillers, receivers, and evaporators to include balancing, aligning, and maintaining turbines, pumps, generators, and ash shredding equipment and preheaters.
8. Ability to maintain difficult balances of a variety of refrigerant controls and complicated motor controls.
9. Skill in troubleshooting complex problems on large projects and applying prescribed test procedures.
10. Skill in the use of hand tools, power tools, and a variety of test equipment.
11. Knowledge of regulations, procedures, and policies related to records maintenance and documentation.

IV. CLASSIFICATION FACTORS

Factor 1. Knowledge

1. Ability to Lead a work crew

2. -- Knowledge of principles and theories including the refrigeration cycle, temperature measurement, and the properties of several refrigerants. Knowledge of pressure and temperature relationships and refrigerant tables.

-- Knowledge of systems that have a variety of compressors, such as gear, reciprocating, centrifugal, or rotary pump, and a variety of refrigerant controls, such as those with low and high pressure side floats, automatic thermostatic expansion valves, capillary or choke types, and those based on volume of or quantity changes.

-- Knowledge of the design and operating characteristics of a variety of large industrial and commercial refrigeration and air conditioning systems. Skill in making air flow calculations.

-- Skill in troubleshooting complex problems and in installing and making extensive repairs on large systems.

-- Knowledge of electrical wiring, electronics, and pneumatics to troubleshoot, test, maintain, and calibrate a variety of systems using solid state and/or pneumatic circuitry. Knowledge of where fixtures, wiring, and controls are installed and how they operate. Skill in measuring, cutting, and bending wire and conduit to specified lengths and angles.

-- Knowledge of mechanical, electromechanical, and pneumatic principles to inspect, install, test, maintain, and repair complex single and multiple fuel power boilers and associated auxiliary (with complicated components, critical requirements, and rigid tolerance), and pollution control equipment, such as water treatment systems, chemical dispensers, electrostatic precipitators, and bag houses and ash removal equipment.

-- Thorough knowledge of automatic and semi-automatic boiler management systems that use manual, electric, electronic, pneumatic, and mechanical controls.

-- Knowledge of safety regulations and procedures.

-- Skill in using hand tools, portable power tools, and a wide variety of test equipment including special tools, such as acetylene torch, ammeters, refrigeration gauges, electronic leak detectors, control devices, vacuum pump, hydraulic press, and micrometers.

-- Skill in dismantling, repairing, and reassembling pumps, impellers, compressors, chillers, receivers, and evaporators to include balancing, aligning, and maintaining turbines, pumps, generators, and ash shredding equipment and preheaters.

-- Skill in reading schematics, blue prints, and technical manuals.

Factor 2. Responsibility

The mechanic independently plans and completes work following the full range of accepted trades practices. Works from work orders, building plans, shop sketches, blueprints, and oral assignment instructions with little or no check during progress. Responsible for making decisions and judgments on complex systems with limited technical guidance. Completed work may be spot-checked for timeliness, accepted trade practices, and customer satisfaction. Makes independent decisions and judgments regarding HVAC/R operations. Routine electrical work is accomplished independently. A journey level electrician or supervisor provides advice on unusual problems or on installation or repair of unfamiliar or complex industrial electrical systems and ensures that completed work meets requirements.

Factor 3. Physical Effort

The employee lifts, carries, and handles equipment up to 50 pounds unassisted and over 50 pounds with assistance. Works from ladders, scaffolding platforms, or cramped areas where equipment, parts, or tools are hard to reach. Work requires frequent stooping, stretching, bending, kneeling, and working in tiring, uncomfortable positions for long periods. In addition, work involves frequent movement and maneuvering of large, heavy equipment using hoists, holders, and pulleys as required.

Factor 4. Working Conditions

The employee works indoors and outdoors, on elevated structures, and in cramped areas. Subject to discomfort from face masks or other protective devices when there is a possibility of exposure to chemicals, heat, steam, noise, noxious gases, fumes, or acids. Occasionally works outside, on top of buildings, in drafty attic spaces, and in cramped areas with low overheads. Subject to possible burns electrical shocks, cuts, strains, bruises, and chemical irritations. To reduce dangers from these and other similar conditions, follows prescribed safety practices and use safety equipment such as safety glasses, hard-toe shoes, respirators, hard hats, and fire retardant gloves.

V. CLASSIFICATION SUMMARY

In this position:

Duty A. 12% WL-User defined duty. Not classified by system. The final grade may or may not be appropriate.-
Working Lead Duties

Duty B. 12% WG-4749-10 Maintenance Mechanic
Plans and Lays Out Work

Duty C. 16% WG-4749-10 Maintenance Mechanic
Troubleshoots HVAC/R systems

Duty D. 12% WG-4749-10 Maintenance Mechanic
Maintains Large Systems

Duty E. 12% WG-4749-10 Maintenance Mechanic
Maintains a Variety of Heating Systems

Duty F. 12% WG-4749-10 Maintenance Mechanic
Performs Electrical Work

Duty G. 12% WG-4749-10 Maintenance Mechanic
Performs Preventive Maintenance

Duty H. 12% WG-4749-10 Maintenance Mechanic
Utilizes Safety Practices

Knowledge 1. user defined, has been linked to duty A.

List of Modified Duties and Factors:

Duty A. has been added.
Knowledge 1 has been added.

OPM Job Grading Standard for Air Conditioning Equipment Mechanic, WG-5306, TS-17 dated June 1971; OPM Job Grading Standard for Heating and Boiler Plant Equipment Mechanic, WG-5309, TS-65 dated November 1992; OPM Job Grading Standard for Electrician, WG-2805, TS-55 dated June 1989; and OPM Job Grading Standard for Maintenance Mechanic, WG-4749, TS-30 dated May 1974.

Remarks: Air Conditioning Equipment Mechanic duties equate to WG-10, Boiler Plant Equipment Mechanic duties equate to WG-10, Electrician duties equate to WG-08.

Note: This is a multi-skilled job. For this SCPD, the primary purpose is to perform heating and air conditioning work. This SCPD should be applied when both of these trades are performed on a regular and recurring basis at the WG-10 level. If a local determination is made that these two skills do not encompass a substantial portion or primary responsibility of the job or the

highest level of work is being performed in a single occupation (e.g. A/C Equipment Mechanic), this SCPD is not appropriate.

Grade: WG-10

VI. CLASSIFICATION REMARKS:

Job Grading Standard for Leader WL/NL (TS-39 dtd Jan 1980 FPM Supplement 512-1) part 1 for Working Leader was applied to duty A. The position leads a crew of 10 employees of a wide variety of trades. Seven WG-10 (AC Mechanics) & Boiler Equip Mechanics) constitute the highest grades led by this position. Consequently, the position is graded at the WL-10 level.